Tsuji Laboratory (Special Issue on the Commemoration of the Fortieth Anniversary)

TSUJI LABORATORY (May 1958~)

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This laboratory was established in May 23 th, 1958, separating from Sakurada Laboratory. Research has been carried out chiefly on the fiber chemistry and the related subjects. Many works have been done in close connection with Sakurada Laboratory. The chief research projects are classified as follows.

I. Synthetic Fiber and Fiber Property

Improvement of properties of vinylon (polyvinyl alcohol fiber) has been one of our important reserach objects. The thermoplasticity (heat settability) and elasticity of vinylon were improved by the mix-spinning of water dispersion (latex) of various synthetic polymers such as polyacrylonitrile, polyvinyl chloride, polyvinyl acetate, polystyrene, polyethylene, etc.[1] These properties were also improved by the graft copolymerization of vinyl monomers such as styrene or methyl methacrylate.[2~4] Heat treated polyvinyl alcohol fiber was treated with titanium lactate and found to resist to hot water.[5] Various properties of acrylic[6] and other fibers[7] were also investigated.

II. Chemical Modification of Fiber

Chemical modification of fibers, espeically of cotton, was studied. On the fibrous acetylation of cotton, the method of acetylation and various properties of acetylated cotton were investigated in detail.[8~15] It was also found that cotton fiber was remarkably decrystallized by the treatment with alkali and acrylonitrile.[16),17] Textile properties of various chemically treated cottons have been examined.[18] Cotton fibers were graft copolymerized with styrene[19], butadiene[20] or reactive monomers[21] such as acrylamide or glycidyl methacrylate. By these ways some properties of cotton, such as thermoplasticity and elasticity, were improved. Some researches were carried out on the stiffness and softening of silk and other fibers.[22~24]

III. Structure and Property of High Polymer

The relation between molecular structure and physical properties was investigated with the object to obtain the fundamental information on fiber and plastics. Spontaneous extension of high polymer films and fibers was one of our intrest.[25] Effects of γ-ray irradiation on mechanical properties of polyethylene[26~28] and polyvinyl alcohol[4] have been shown. Molecular weight and its heterogeneity had important effects on the physical properties of polymer solid[29] and melt.[30] Static and dynamic mechanical porperties of the films of polypropylene fractions which had wide variety in molecular weight and crystallinity were studied.[31~33] The structure and physical properties of crystalline homo- and copolymers of various olefins, such

as styrene, butene-1, 3-methyl-butene-1, 4-methyl-pentene-1, etc., were also the objects of our interest.[34,35] The isothermal crystallization of slightly crosslinked polyethylene in the stretched state was being studied in detail.[36,37]

IV. Miscellaneous

As an application of the science of fiber and adhesive, the study on nonwoven fabrics was intended.[38,39] New adhesives consisting of copolymers of acrylic acid esters and vinyl acetate are now being developed as binders for nonwoven fabrics.

Publications

(* indicates an article published in Japanese)

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